

**PATENT COOPERATION TREATY**  
**PCT**

**INTERNATIONAL SEARCH REPORT**

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>12256731/ARS</b>	<b>FOR FURTHER ACTION</b>	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. <b>PCT/AU2004/000784</b>	International filing date ( <i>day/month/year</i> ) <b>15 June 2004</b>	(Earliest) Priority Date ( <i>day/month/year</i> ) <b>16 June 2003</b>
Applicant <b>WEIR WARMAN LTD et al</b>		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of **5** sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

**2. ☐ Certain claims were found unsearchable (See Box No. II).**

**3. ☐ Unity of invention is lacking (See Box No. III).**

**4. With regard to the title,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

**5. With regard to the abstract,**

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

**6. With regard to the drawings,**

- a. the figure of the **drawings** to be published with the abstract is Figure No. **5**

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☒ as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

**Box No. IV Text of the Abstract (Continuation of item 5 of the first sheet)**

An impeller for use in a centrifugal pump, the impeller (20) including a shroud having opposed faces, an outer peripheral edge portion and a rotation axis, a plurality of pumping vanes on one of the faces of the shroud and extending away from the rotation axis, each pumping vane having an outer peripheral edge portion, and a plurality of auxiliary vanes (26) on the other face of the shroud, the auxiliary vanes each having an outer edge portion wherein the dimension  $D_a$  from the rotation axis to the outer peripheral edge portion of the shroud is greater than the dimension  $D_b$  from the rotation axis to the outer edge portion of the auxiliary vanes.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2004/000784

## A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. <sup>7</sup>: F04D 29/22, 29/24, 7/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Refer electronic database consulted below

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
DWPI - keywords centrifugal pump, auxiliary, additional, shroud, enclosed, vane, blade and similar terms

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5489187 A (RAY) 6 February 1996 Fig 1	1
X Y	US 5165858 A (GILBERT et al) 24 November 1992 Column 6, lines 7-25, fig 6	1 2-11
X	Derwent abstract accession No. 84-217836/35, class Q56, SU 1064047 A (ALEKSANDROV) 30 December 1983 Abstract	1
Y	EP 567123 A1 (PRAXAIR TECHNOLOGY, INC.) 27 October 1993 Fig 1	2-11

☒ Further documents are listed in the continuation of Box C
 ☒ See patent family annex

* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search  
29 July 2004

Date of mailing of the international search report

12 AUG 2004

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2004/000784

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4664592 A (GRZINA) 12 May 1987 Fig 4	2-11
A	US 3384026 A (WILLIAMSON, JR) 21 May 1968	
A	US 4883403 A (WALKER) 28 November 1989	
A	US 5921748 A (FRATER) 13 July 1999	

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2004/000784

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
US	5489187	AU	72451/96	CA	2232735
		NZ	319837	US	5591001
		US	6074554	WO	9713071
		GB	2320742	US	6036434
		ZA	9608140		
US	5165858	EP	0389149	US	5088893
EP	0567123	BR	9301625	BR	9401335
		CA	2120428	CN	1084614
		EP	0645522	JP	6010603
		US	5342171	JP	7102903
US	4664592	AU	30237/84	BR	8403492
		GB	2143285	IN	161816
		PH	22483	CA	1240557
				JP	60036800
US	3384026				
US	4883403	AU	80718/87	BR	8707496
		EP	0288500	WO	8802820
US	5921748	AU	47090/96	BR	9607465
		EP	0812392	WO	9627085
				CA	2214415
				ZA	9601552
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.					
END OF ANNEX					